

REPORT DOCUMENTATION PAGE

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Introduction: Semi-automatic defibrillators are currently used on a number of commercial airlines throughout the world. The most important factors determining outcome are the underlying cardiac rhythm and the time from "collapse" to "shock". Ventricular fibrillation (VF) has been estimated to be the presenting rhythm in approximately 70% of cases in sudden cardiac arrest (SCA) in public places. Previous work in UK airlines has shown the mean prevalence of VF to be 31% which may significantly affect the prospect of a successful outcome. **Methods:** To further expand the data set, information from 2006 was provided to the UK CAA Aviation Health Unit (AHU) by Emirates Airlines, which operates an all wide-bodied fleet of 110 aircraft to 94 destinations in 60 countries, from its Dubai hub. **Results:** In 2006 the AED was used onboard on 23 occasions. 87% of the passengers on which the AED was used were male or above the age of 50 years (83%). Of the 23 cases only 5 (22%) had a shockable rhythm. Of these only one was successfully defibrillated (4%). Most of the incidents occurred during the cruise (91%) or the landing phases (8%) and resulted in 4 diversions. During 2006 17 million passengers were carried on 95,093 flights by the airline. **Discussion:** The rate of ventricular fibrillation (VF) is similar to that previously presented from three UK airlines (30%). With this lower rate of VF, a multi-centre study with standard outcome measures is needed to elucidate the role and cost effectiveness of AEDs in the commercial aviation environment.

Learning Objectives: 1. To understand the role of AEDs on commercial aircraft. 2. To ascertain the rate of shockable rhythms on board aircraft.

[432] DRUGS AND FLYING: IMPLICATIONS FOR THE GENERAL AVIATION PILOT

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Introduction. Drugs of many different types have long been known to impact performance in high demand environments. Because of this, approved drugs in aviation are severely restricted, in order to protect pilots from the possible negative effects of a drug on their ability to operate an aircraft. Unfortunately, not all pilots heed this advice, and the result may be disastrous. This study examined the relationship between impairment due to drugs and alcohol and accidents in general aviation. **Method.** A search among a previously compiled database of general aviation accident reports between the time frame of 1990 and 2003 from the National Transportation Safety Board (NTSB) was conducted. This resulted in 338 reports that matched the criteria of this study. **Results.** The drug classifications investigated in these reports include any single or combined use of alcohol, antihistamines, opiates, stimulants, barbiturates, benzodiazepines, non-steroidal anti-inflammatory drugs (NSAID), analgesics, antidepressants, and cannabis. About 50% of accidents involving drugs, and 50% involving alcohol were controlled flight into terrain (CFIT). The drugs were considered by behavioral effect, either stimulant or depressant, which yielded a 96% and 89% fatality rate respectively. The overall fatality rate for accidents attributed to impairment is 88%. **Discussion.** Pilots should be aware of the consequences of flying while under the influence of drugs whether licit or illicit. Even seemingly benign, over the counter drugs may have enough of a deleterious effect to result in an accident. The potentially negative effects of drugs on piloting skills should be reviewed numerous times during flight training.

Learning Objectives: 1. To bring awareness to the aerospace community of the serious consequences of flying while experiencing impairment due to drugs and alcohol.

[433] COGNITIVE PERFORMANCE DURING 12 HOURS AT 10,000 FT ALTITUDE DURING NIGHT CONDITIONS.

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Introduction: Military un-pressurized aircraft are flown without supplemental oxygen up to 10,000 feet. This study investigated the effects of low-grade hypoxia exposure at 10k ft during 12 hours night conditions on cognitive performance. **Methods:** Hypobaric exposures in a simulated night-operational aircraft environment were conducted with 30 military personnel. Each subject accomplished two 12 hour sessions, one at slightly above ground level pressure and one at 10k ft altitude. Half of the subjects participated in a 10 min moderate exercise on a bicycle ergometer every second hour. Cognitive performance was measured with a computer

based program called the Automated Neuropsychological Assessment Metrics. After training, grammatical reasoning, mathematical processing, simple reaction time, spatial processing ability and short-term memory were assessed. **Results:** Significant time effects were seen for eleven of the fourteen cognitive measures. These measures showed significant improvement in performance over time regardless of the altitude condition. The improvement started early and continued through the duration of the session. A significant exercise by altitude interaction was found for one outcome measure, short term memory-mean reaction time (MRT). While post-hoc comparisons did not reveal any specific differences, the largest improvement over the duration of the sessions occurred in the exercise group while at 10k ft, while the smallest improvement occurred in the non-exercise group at ground level. A significant altitude effect was seen for Grammatical Reasoning-MRT. While MRT generally improved over time for both conditions, the improvement was significantly greater during the 10k ft condition between the 4th and 11th hours of the experimental sessions. No significant effects were found for any other variable. **Discussion:** The significant improvement seen for the majority of outcome measures was likely due to a combination of circadian factors and learning. In addition, exposure to 10k ft altitude had no significant negative impact on cognitive function.

Learning Objectives: 1. The relationship between cognitive performance and moderate altitude will be discussed.

Wednesday, May 14

2:00 PM

PANEL: Aerospace Medicine Grand Rounds

[466] AEROSPACE MEDICINE GRAND ROUNDS

E. RODRIGUEZ

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Three separate ninety (90) minutes "Grand Round" sessions will be held consisting of eighteen (18) different clinical aeromedical cases. These cases will be presented in a format that allows attendees to follow a case from initial clinical presentation to final aeromedical disposition. The presentations will be limited to ten (10) minutes with five (5) minutes left for a question and answer period. Each case will be selected to best represent the decision making process that is most appropriate in each clinical area in promoting flight safety and fairness to the aviator. Each case will include the patient's initial presentation, history and physical examination, the medical tests that were ordered, the differential and final disposition, the aeromedical concerns and the final aeromedical disposition. This presentation will be an excellent review of clinical flight medicine practice and the decision making process required to provide consistent, fair, and reasonable aeromedical dispositions. The attendees will be able to compare their handling of similar cases with those presented and review decision making criteria for aeromedical disposition. Cases will be presented by Residents in Aerospace Medicine (RAM) from each of the four accredited residency programs in the United States: Naval Operational Medicine Institute, Pensacola Naval Air Station, FL; USAF School of Aerospace Medicine, Brooks City-Base, TX; University of Texas Medical Branch, Galveston, TX; Wright State University, Dayton, OH.

Learning Objectives: 1. This panel will discuss and review the processes involved in making appropriate aeromedical dispositions on aviators.

Wednesday, May 14

2:00 PM

SLIDE: Motion Sickness & Stress

[435] INCREASING POSTURAL VARIABILITY IN THE MEDIO-LATERAL DIRECTION CAN BE BENEFICIAL FOR VISUAL PERFORMANCE

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In the literature, an increase in postural variability is typically interpreted as a sign of instability. It has been argued, however, that the equation of variability and instability is not imperative (e.g., Riley & Turvey, 2002). We report an experiment in which postural fluctuations were recorded from 12 younger (19.83 years \pm 2.08) and 12 older adults (74.58 years \pm 5.18), who engaged in either counting the number of appearances of a target letter in a page of text, or simply staring at a blank page of the same